



US009638536B2

(12) **United States Patent**
Ono

(10) **Patent No.:** **US 9,638,536 B2**
(45) **Date of Patent:** **May 2, 2017**

(54) **NAVIGATION DEVICE, ROUTE GUIDANCE CONTROL METHOD IN NAVIGATION DEVICE, AND NON-TRANSITORY COMPUTER-READABLE STORAGE MEDIUM STORING PROGRAM**

(71) Applicant: **ALPINE ELECTRONICS, INC.**,
Shinagawa-ku, Tokyo (JP)

(72) Inventor: **Tatsuya Ono**, Iwaki (JP)

(73) Assignee: **Alpine Electronics, Inc.**, Tokyo (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 112 days.

(21) Appl. No.: **14/680,202**

(22) Filed: **Apr. 7, 2015**

(65) **Prior Publication Data**

US 2015/0330802 A1 Nov. 19, 2015

(30) **Foreign Application Priority Data**

May 19, 2014 (JP) 2014-103190

(51) **Int. Cl.**
G01C 21/36 (2006.01)
B60W 50/14 (2012.01)
B60K 35/00 (2006.01)
G05D 1/00 (2006.01)

(52) **U.S. Cl.**
CPC **G01C 21/3626** (2013.01); **B60K 35/00**
(2013.01); **B60W 50/14** (2013.01); **G05D**
1/0061 (2013.01); **G01C 21/3629** (2013.01);
G05D 2201/0213 (2013.01)

(58) **Field of Classification Search**
CPC B60W 50/14; G05D 1/0061; G05D
2201/0213

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,343,399 A * 8/1994 Yokoyama G01C 21/3629
340/990
8,260,482 B1 * 9/2012 Szybalski B62D 1/286
701/23
9,216,746 B2 * 12/2015 Ham G01C 21/28
9,230,556 B2 * 1/2016 van Os G10L 21/00

(Continued)

FOREIGN PATENT DOCUMENTS

DE 10123482 11/2002
EP 1308812 5/2003

(Continued)

OTHER PUBLICATIONS

Extended European Search Report and Official Communication for EPO15163213.0 dated Oct. 12, 2015, 9 pgs.

Primary Examiner — Todd Melton

(74) Attorney, Agent, or Firm — Brinks Gilson & Lione

(57) **ABSTRACT**

A navigation device mounted in a vehicle travelling in any driving mode out of an automatic driving mode for travelling irrespective of a driver's driving operations and a normal driving mode for travelling according to the driver's driving operations includes a driving mode determination unit for determining whether a driving mode of the vehicle is the automatic driving mode or the normal driving mode, and a route guidance stop control unit for, when the driving mode determination unit determines that a driving mode of the vehicle is the automatic driving mode, stopping route guidance made while the vehicle is travelling in the normal driving mode.

20 Claims, 6 Drawing Sheets

